

## **REMARKS**

### **Status of the Application**

Prior to entry of this response, claims 16-20 were withdrawn, and claims 22-24, 27 and 28 were pending examination. Claims 21, 25 and 26 were previously canceled. In this response, no claims have been amended or added. Claims 16-20 have been cancelled. Therefore, claims 22-24, 27 and 28 remain pending for examination.

Claims 22-24, and 27 stand rejected under 35 U.S.C. §102(e) as anticipated by the cited portions of U.S. Pat. No. 5,788,778 ("Shang"). Claim 28 stands rejected under 35 U.S.C. §103(a) as unpatentable over Shang.

Reconsideration of the application in light of the remarks below is respectfully requested.

### **Remarks**

#### **Claim 22**

Claim 22 stands rejected as being anticipated by Shang. Applicant respectfully traverses this rejection at least because Shang does not teach all of the recitations of claim 22.

Claim 22 recites, in part,

"[a] method of removing residue from a substrate processing chamber, said method comprising the steps of:

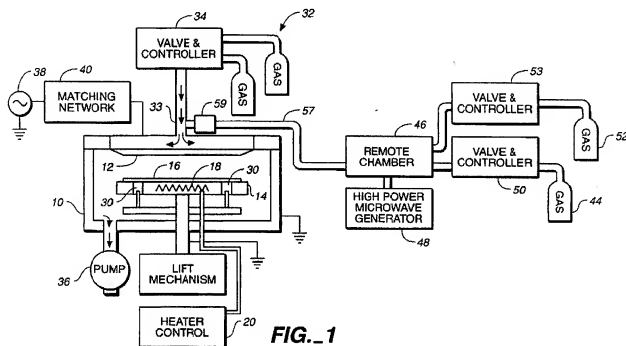
forming a plasma remotely with respect to said chamber, said plasma including a plurality of reactive radicals; ...

**forming a nonplasma diluent gas flow, wherein said nonplasma diluent gas flow comprises at least one of an inert gas or a reduction gas;**  
[and]

**mixing said flow of said reactive radicals and said diluent gas flow at a mixing location downstream of a location of forming said flow of**

**said reactive radicals** and anterior to said chamber to form a gas-radical mixture[.]” (emphasis added)

The Office Action cites to Figure 1 of Shang, as well as the discussion thereof, as teaching the above recitations. Figure 1 of Shang is reproduced below for the Examiner's convenience:



Regarding the system of Shang, the Office Action states on page 2 that a nonplasma diluent gas flow of inert gas or reduction gas (specifically hydrogen) is provided by elements 32 and 34 and that the flow is mixed with plasma precursor provided by element 44 at the junction of element 33, which is downstream of the remote chamber (element 46) where the plasma is formed.

However, Shang does not disclose that elements 32 and 34 provide a nonplasma diluent gas flow of hydrogen or any other inert gas or reduction gas. Instead, Shang discloses that element 52 provides a nonplasma diluent gas flow of hydrogen or one of several other gases

directly to the remote chamber, and that elements 32 and 34 merely provide a nonplasma diluent gas flow whose composition "depend[s] on the materials . . . to be deposited on the substrate."

Shang does not disclose any possible compositions of the flow provided by elements 32 and 34, much less that the flow comprises an inert or reduction gas. The pertinent portions of Shang which discuss elements 32, 34, and 52 are reproduced below for the Examiner's convenience:

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Outside of chamber 10, there is a gas supply 32 containing the gases that are used during deposition. The particular gases that are used depend upon the materials are to be deposited onto the substrate. The process gases flow through an inlet port into the gas manifold and then into the chamber through the shower head. An electronically operated valve and flow control mechanism 34 controls the flow of gases from the gas supply into the chamber. Also connected to the chamber through an outlet port is a vacuum pump 36, which is used to evacuate the chamber.

...

Optionally, there may also be a source of a minor carrier gas 52 that is connected to the remote activation chamber through another valve and flow control mechanism 53. The minor carrier gas aids in the transport of the activated

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species to the deposition chamber. It can be any appropriate nonreactive gas that is compatible with the particular cleaning process with which it is being used. For example, the minor carrier gas may be argon, nitrogen, helium, hydrogen, or oxygen, etc. In addition to aiding in the transport of activated species to the deposition chamber, the carrier gas may also assist in the cleaning process or help initiate and/or stabilize the plasma in the deposition chamber.

Accordingly, the only nonplasma diluent gas flow disclosed by Shang that does comprise an inert or reduction gas (element 52) is mixed with plasma in the remote chamber, not downstream of the remote chamber as recited by claim 22. Furthermore, Shang does not disclose the composition of the only gas flow that may be mixed with plasma downstream of the remote chamber (element 32), whereas claim 22 recites such a flow comprising at least one of an inert gas or a reduction gas.

Therefore, Shang does not teach “forming a nonplasma diluent gas flow, wherein said nonplasma diluent gas flow comprises at least one of an inert gas or a reduction gas; [and] mixing [a] flow of . . . reactive radicals and said diluent gas flow at a mixing location downstream of a location of forming said flow of said reactive radicals and anterior to said chamber to form a gas-radical mixture” as recited in claim 22. Because Shang does not teach such a recitation, Shang does not teach all of the recitations of claim 22. Consequently, Shang does not anticipate claim 22. Therefore, Applicant respectfully requests withdrawal of the §102 rejection of this claim.

Claims 23, 24, 27 and 28

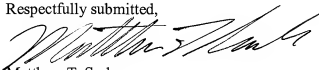
Claims 23, 24 and 27 stand rejected as being anticipated by Shang. Claim 28 stands rejected as being obvious over Shang. Each of these claims depends from claim 22, and is therefore believed to be allowable at least by virtue of its dependence from an allowable base claim. Therefore, Applicant respectfully requests withdrawal of the §102 and §103 rejections of these claims.

**CONCLUSION**

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,



Matthew T. Sarles  
Reg. No. 58,696

TOWNSEND and TOWNSEND and CREW LLP  
Two Embarcadero Center, Eighth Floor  
San Francisco, California 94111-3834  
Tel: 303-571-4000  
Fax: 415-576-0300  
MTS:cmb  
61439714 v1